The Feasibility of Wind Power for Bridgestone Nature Reserve at Chestnut Mountain

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Introduction

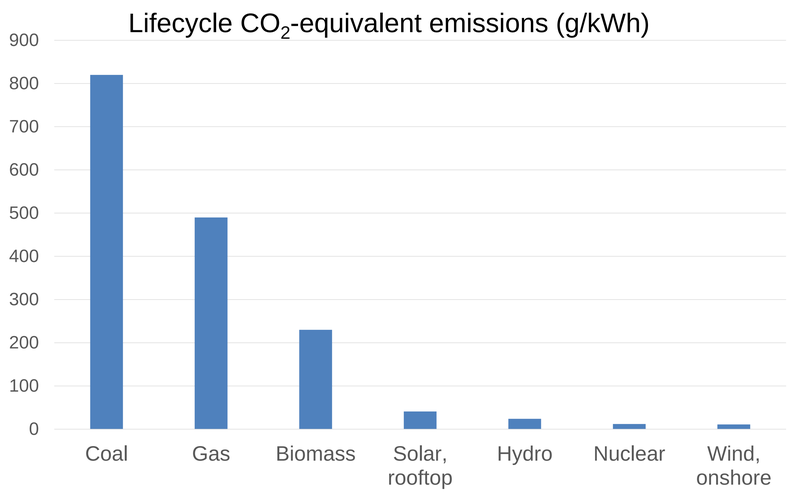
This project involved researching the feasibility of bringing wind power to The Nature Conservancy's Bridgestone Nature Reserve at Chestnut Mountain. The Nature Conservancy tasked us with finding a renewable source of energy for their property to lower their carbon footprint. We researched many aspects of wind energy including its carbon footprint, energy efficiency, cost efficiency, effects on the surrounding environment, and ease of disposal. We then used our research to decide if wind power would be the best option for the Chestnut Mountain property.

Findings

- Wind turbines are very carbon-efficient, producing between 5 and 26 grams of CO_2 equivalent per kilowatt hour.
- Sparta, TN has an average wind speed of 4.7 mph (2.1 m/s).
- A turbine on the Chestnut Mountain property would have the potential to disrupt two endangered bat species (the gray bat and the Indiana bat) and one threatened bat species (the northern long-eared bat).
- Currently, there is no easy way to dispose of wind turbines, and most end up in landfills.

Pros

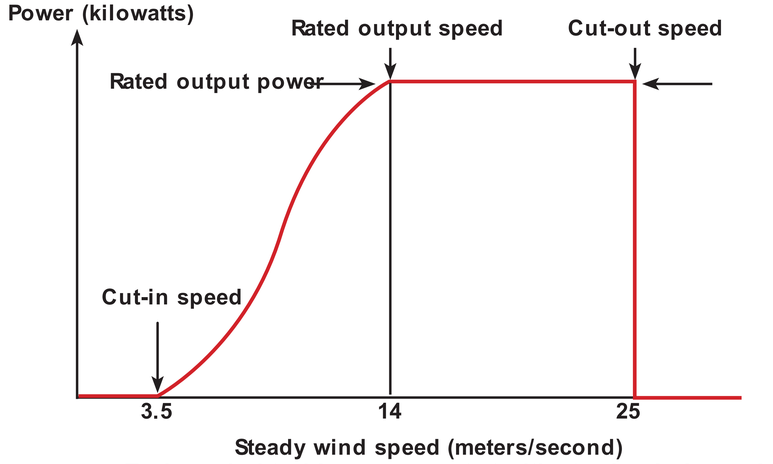
- Clean and renewable source of energy
- Reduced reliance on fossil fuels
- Low general operating costs
- Possibility of recouping costs
- Government incentives and funding mechanisms



Median values calculated by the Intergovernmental Panel on Climate Change (2014).

Cons

- Difficult and costly transportation, installation, and maintenance
- High susceptibility to damage
- Many environmental concerns – habitat degradation, disruption of migration patterns, noise pollution
- Difficult disposal
- Low amounts of wind at The Nature Conservancy would render the turbines essentially ineffective



Typical wind turbine power outlet with steady wind speed.

Source: U.S. Department of Energy

Recommendations

For middle Tennessee, wind power is not a productive use of resources. While it may be a viable source of power for some parts of the country, the wind that we have in this part of the east is inconsistent and not strong enough to compensate for the environmental detriments that accompany turbine production, use, and disposal. While it has the potential to be a good alternative to fossil fuels, the technology is not yet efficient or sophisticated enough for the investment that is put into it. We recommend greater focus on solar powered electricity when trying to reduce fossil fuel use.

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